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ABSTRACT

Thirty-eight bidialectical rural Hawaiian children participated in a study to determine if they would display clustering in a cued recall task and to explore the possible influence of dialect usage on recall performance. For purposes of the study, "clustering" was defined as the ability of subjects to recall list items by category membership and not in a rote fashion. The subjects, six-, eight-, and twelve-year olds, were given three lists, each containing four words from four different categories. After reading a list, a child was asked to recall all the words from a specified category. Half of the subjects were tested in the Hawaiian-Creole English (Pidgin) dialect and half in standard English. Results confirm strong developmental differences in both the number of recalled items and the degree of clustering. They also confirm that rural Hawaiian children possess the requisite processes and cognitive structures to organize and recall list items by category. The findings indicate that there were no significant effects attributable to dialect. (FL)

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Technical Report # 71

A Study of Cued Free Recall Learning among Rural Hawaiian Children Using Standardized Norms [1]

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The Kamehameha Early Education Program

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Technical Report # 71

A Study of Cued Free Recall Learning among Rural Hawaiian Children Using Standardized Norms

Tom Ciborowski D. Price-Williams

Ciborowski and Price-Williams administered a free recall task using items derived from norms developed in the Continental United States (Battig & Montague, 1969; Palermo & Jenkins, 1964) to a group of rural Hawaiian schoolchildren. The results of that study were somewhat surprising in that no age differences were obtained and no evidence was obtained for clustering in the recall protocols of the subjects. By clustering we mean the ability of subjects to recall list items by category membership and not in a "rote" fashion (cf., Bousefield, 1953; Cole, Frankel, & Sharp, 1971; Mandler, 1967; Nelson, 1969; and Tulving, 1962). The above findings were tentatively interpreted as suggesting that perhaps the recall items were not as socially and culturally relevant to rural Hawaiian children as they were to children residing in the Continental United States.

Jensen and Fredericksen (1973) administered organized and unorganized recall lists to groups of white and black children. Their results indicated that the black children failed to show a reliable degree of clustering in recall performance. Jensen and Fredericksen interpreted this lack of clustering performance as indicating the lack of requisite processes, which in turn was interpreted by them as evidence for the absence of a fundamental underlying cognitive structure. Scribner and Cole (1975) took very strong issue with the interpretation that the absence of clustering indicates the lack of some process or structure. Working with a group of West African subjects, Cole et al. (1971) demonstrated three separate ways of producing a high degree of clustering among subjects who do not

display clustering when tested in the usual way. In the present study, we used one of these ways in an effort to assess whether a group of rural Hawaiian children would cluster their recall protocols although the items to be recalled were likely to be relatively unfamiliar to members of their social cultural community.

In the present experiment the subjects were cued to the categories in the recall list (cf., Eysench & Baron, 1974; Scribner & Cole, 1972; and Shultz, Charness & German, 1973). For example, one of the four different categories comprising the recall list in the present experiment was the category Musical Instruments (violin, trumpet, piano, etc.). After reading the list the child was asked to recall all the words from the list that are Musical Instruments. This procedure was followed until all the categories were exhausted.

A major variable in the present experiment was the dialect used in presenting the recall lists. Half of the subjects in the present study were tested in Pidgin and the remaining half were tested in Standard English. Pidgin is a major dialect of the English language and it shares many of the same features of other Creole variants of the English language (Carr, 1972). The authors adhere to current linguistic convention in considering Pidgin and Standard English as merely different dialects of the English language, with no implication that one dialect is linguistically more "complex" than the other.

The motivation for the present experiment was two fold. First, we sought to determine if a group of rural Hawaiian children would display clustering in a cued recall paradigm using list items that were perhaps relatively unfamiliar. Second, we continued to explore the possible influence of dialect useage on recall performance.

Method

Subjects

A total of 38 children from Hookena Elementary School participated in the present experiment. There were 10 children from the first grade (median age of 6 years, 4 months), 14 children from the third and fourth grade (median age of 8 years, 5 months), and 14 children from the seventh grade (median age of 12 years, 6½ months). To simplify presentation, we will refer to the children as simply the 6-year-olds, the 8-year-olds, and the 12-year-olds. The children are predominantly Hawaiian in ancestry and live in an isolated fishing village located on the south Kona coast of the Big Island of Hawaii. The children and experimental site are thoroughly described in earlier technical reports in this series.

Stimuli

The stimuli consisted of three lists of 16 words each. Each list contained four words from four different categories. The categories and words used were: Musical Instruments (violin, drum, trumpet, piano); Weapons (gun, club, knife, bomb); Professions (teacher, dentist, doctor, lawyer); and Sports (baseball, basketball, football, tennis). The categories and category items were derived from the Palermo and Jenkins (1964) and Battig and Montague (1969) norms. The three recall lists were randomly arranged with the restriction that each word appear in a different position on each list.

Design

Half of the subjects from each age group were tested in Pidgin, while the remaining half from each age group were tested in Standard English. Each child received the three lists in the same order.

Procedure

The experiment was conducted by a Hawaiian woman who is verbally skilled in both Pidgin and Standard English. The instructions were first written in Standard English and translated into Pidgin by the Hawaiian research assistant. Each

child was told that they would be playing a game with some words and that they would be read a list of words three times. They were told to listen carefully and remember as many of the words as possible because at the end of each list they would be asked some questions about the words. After reading each list each child was asked the following four questions:

1.) Tell me all the words on the list that go together with musical instruments.

2.) Tell me all the words on the list that go together with jobs or kinds of work.

3.) Tell me all the words on the list that go together with weapons.

4.) Tell me all the words on the list that go together with sports.

The Hawaiian research assistant tape recorded all of the responses from each child.

Results

The two measures of performance were the number of items recalled and a clustering score patterned after the work of Dallet (1964) and Nelson (1969). The two measures were submitted to an analysis of variance.

Analysis confirmed that in terms of clustering the age factor was significant, $F(2,32) = 18.94$, $p < .01$. A series of Newman-Keuls tests revealed that both the 8 and 12-year olds clustered significantly more than the 6-year olds, $q(2,30) = 6.22$, $p < .01$, and $q(3,30) = 8.56$, $p < .01$, respectively. There was no significant difference in performance between the 8 and 12-year olds.

Analysis confirmed that there were no significant effects attributable to dialect.

In terms of degree of clustering, analysis confirmed that the trials factor was significant, $F(2,64) = 28.36$, $p < .01$. A series of Newman-Keuls tests revealed that the subjects clustered significantly more on the second and third trials than on the first trial, $q(2,38) = 7.24$, $p < .01$, and $q(3,38) = 11.61$, $p < .01$, respectively. Analysis also confirmed that the subjects clustered sign-

ificantly more on the third trial than on the second trial, $q(2,38) = 4.38$, $p < .01$.

Analysis confirmed that in terms of degree of clustering the age factor significantly interacted with trials, $F(4,64) = 6.13$, $p < .01$. A series of Newman-Keuls tests revealed an interesting pattern of performance. The 6-year olds failed to show any improvement across trials. The 8-year-olds significantly improved on the second trial over the first trial, $q(3,14) = 3.94$, $p < .05$, but third trial performance was not superior to second trial performance. The 12-year-olds showed significant improvement across all trials. Second trial performance was superior to first trial performance, $q(4,14) = 7.22$, $p < .01$, and third trial performance was superior to second trial performance, $q(3,14) = 4.22$, $p < .05$.

In terms of number of items recalled analysis confirmed a significant age effect, $F(2,32) = 26.42$, $p < .01$. Newman-Keuls tests revealed that both the 8- and 12-year-olds recalled significantly more items than the 6-year-olds, $q(2,30) = 7.24$, $p < .01$, and $q(3,30) = 8.59$, $p < .01$. There was no difference in performance between the 8 and 12-year-olds.

Analysis confirmed a significant interaction between age and dialect, $F(2,32) = 3.43$, $p < .05$. For the 6-year-olds a Newman-Keuls test failed to confirm a significant difference in the number of recalled items when the test was conducted in Pidgin (5.6 mean items) as opposed to when the test was conducted in Standard English (2.8 mean items). However, a t-test revealed that recall performance in Pidgin was significantly better than in Standard English, $t = 2.75$, $df. = 28$, $p < .01$. The t-test finding was supported by a significant finding using the nonparametric Mann-Whitney U test, $U(15,15) = 54$, p .01. Apparently, the Newman-Keuls test is a conservative test. Nevertheless, Kewman-Keuls tests revealed that the 8 and 12-year olds recalled significantly more items than the

6-year olds in both the Pidgin and Standard English conditions. There was no difference in performance between the 8 and 12-year olds.

Analysis revealed that the trials factor was significant, $F(2,64) = 28.17$, $p < .01$. Newman-Keuls tests confirmed that more items were recalled on both the second and third trials than on the first trial, $q(2,38) = 7.78$, $p < .01$, and $q(3,38) = 11.26$, $p < .01$. Also, significantly more items were recalled on the third trial then on the second trial, $q(2,38) = 3.47$, $p < .05$.

Analysis confirmed a significant interaction between age and trials, $F(4,64) = 4.13$, $p < .01$. Newman-Keuls tests revealed that the recall performance of the 6-year-olds did not improve across trials. The 8-year-olds recalled more items on the second trial (10.2 mean items) than the first trial (7.4 mean items), $q(3,14) = 4.46$, $p < .05$, but did not recall significantly more items on the third trial (11.8 mean items) than the second trial. The recall performance of the 12-year-olds steadily improved across trials (7.3, 11.6, and 13.7 mean items). Second trial recall was significantly superior to first trial recall, $q(4,14) = 6.87$, $p < .01$, and third trial recall was significantly superior to second trial recall, as shown by a Mann-Whitney U-test, $U(14,14) = 55$, $p < .05$.

Discussion

In two earlier technical reports in this series a group of rural Hawaiian schoolchildren failed to show any reliable evidence for clustering in their recall performance in a standard memory task. If we were to adhere to the viewpoint of Jensen and Fredericksen (1973), we would be led to the conclusion that the Hawaiian children lack a psychological process or underlying cognitive structure. The results of the present study however, argue strongly against any such conclusion.

By cueing the subjects to the categories and constraining them to recall by category, a high degree of clustering was obtained. This finding implies that although the subjects may not spontaneously engage in the mnemonic activity of

organizing recall items, they are completely capable of this activity. Such activity demonstrates that rural Hawaiian children possess the requisite cognitive skills and processes underlying the capacity to organize and cluster items in a memory task. It is important to note that this capacity was demonstrated even though the items comprising the recall list were derived from norms collected in the Continental United States, and hence the items may have been relatively unfamiliar to the Hawaiian children. For example, many of the younger children said that they did not know a number of items on the list (e.g., tennis, bomb, violin, club).

The factor of the number of trials merits discussion. In the technical report cited earlier, which did not produce clustering, the subjects received only two trials, but in the present experiment the subjects received three trials. It cannot be argued that the extra trial was the critical agent in producing clustering, even though other research has shown that clustering is usually obtained only on the later trials. That is, in the present experiment the trials factor proved significant and analysis confirmed a higher degree of clustering on the second trial than on the first trial. This finding forces us to conclude that the display of clustering is attributable to the cued category technique and not to the third and extra trial.

An interesting finding of the present study was the age by dialect interaction in terms of the number of recall items. The 6-year-olds recalled more items when the test was conducted in Pidgin than in Standard English. This finding is in line with the results of Technical Report No. K 1 which used the same list items but did not constrain the subjects to recall by category. In that study the first graders (6-year-olds) recalled more items in the Pidgin condition than in the Standard English condition. Collectively, the two studies would seem to suggest that the influence of the Pidgin dialect upon recall performance is restricted to the first year or two of school. By the time the children are in the third grade

a pattern emerges in which Standard English recall performance is either superior to Pidgin recall performance, or there is no difference in performance between the two dialect conditions. This performance pattern would seem to indicate that the focus of a need for special program adjustments in the beginning school years.

It is important to note that in the two studies in this series in which strong clustering effects were obtained, no influences of dialect upon clustering performance were observed. Where dialect influences were observed the effects were restricted solely to the number of items recalled. Clustering (and hence reorganization of input) of the list items is probably a higher order psychological process than just recalling a number of items. If this is true it would seem that Pidgin dialect fluency not only has little or no effect after several years of school, but also little or no effect on higher psychological processes.